

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-2 (canceled)

Claim 3 (currently amended) The apparatus of Claim 1 ~~10~~, ~~wherein the means for adjusting the sampling rate comprises~~ further comprising at least one of the following components coupled to the receive path and to the scaler to vary the sampling rate of the received communication channel:

- an analog-to-digital converter with a variable sampling rate; and
- a decimator with a variable decimation amount.

Claims 4-5 (canceled)

Claim 6 (currently amended) ~~The An~~ apparatus of Claim 4, ~~wherein the TEQ taps further comprise:~~ for suppressing intersymbol interference in a received communication channel of a modem comprising:

- means for adjusting the sampling rate of the received communication channel;
- a time domain equalizer (TEQ) with a plurality of taps into the received communication channel and the TEQ responsive to an adjustment of the sampling

rate by the means for adjusting to configure at least one of a number of taps and delays between the taps operating on the receive path and the TEQ including:

- a delay line accepting successive portions of a received communication channel;
- taps off of the successive portions of the delay line with each tap configured to scale each successive portion by an associated weighting coefficient to provide a corresponding scaled output;
- a summer coupled to the taps to sum the scaled outputs there from;
- a controller to varying at least one of: a length of the delay line, a number of the taps providing output to the summer and a number of successive portions of the received communication channel between taps;
- weighting modules each with an input coupled to a corresponding successive portion of the delay line and an output coupled to the summer, and each of the weighting modules configured to scale each corresponding successive portion by the associated weighting coefficient to provide the corresponding scaled output; and
- switches each associated with a corresponding weighting module to switchably control the coupling thereof between the delay line and the summer, and the switches operative to uncouple selected ones of the weighting modules to vary a number of the taps providing output to the summer.

Claim 7 (currently amended) The apparatus multi-tone X-DSL modem of Claim 4-10, wherein the TEQ ~~controller~~ further comprises:

- a delay line accepting successive portions of the received communication channel;
- taps off of the successive portions of the delay line with each tap configured to scale each successive portion by an associated weighting coefficient to provide a corresponding scaled output;
- a summer coupled to the taps to sum the scaled outputs there from; and
- a skip controller to determine from relative magnitudes of the associated weighting coefficients for each of the taps generated in a training phase of operation the ~~number~~ of the taps providing output to the summer.

Claim 8 (currently amended) A method for ~~suppressing~~ reducing intersymbol interference in a ~~received~~ communication channel ~~of received by a~~ multi-tone X-DSL modem coupled to the subscriber line, and the method comprising:

- initiating multi-tone modulation of the communication channel over the subscriber line over a frequency range proscribed by a corresponding X-DSL communication protocol;
- determining ~~a highest useful frequency component in the~~ whether the received communication channel initiated in the initiating act exhibits a cutoff frequency less than a maximum frequency proscribed by the corresponding X-DSL communication protocol, above which cutoff frequency communications are not supportable;
- ~~adjusting the~~ reducing a sampling rate of the received communication channel ~~to conform with the determination of the highest useful frequency component below a~~ sampling rate required to support the corresponding X-DSL communication protocol responsive to the determination of the cutoff frequency in the determining act; and

- ~~adjusting~~ increasing at least one of a number of time domain equalization taps operating on ~~the~~ a receive path of the multi-tone X-DSL modem and delays between the taps operating on the receive path responsive to the ~~adjustment~~ reduction of the sampling rate in the ~~reducing~~ act ~~of adjusting the sampling rate~~, whereby a number of time domain equalization taps increase in correspondence with a length of the subscriber line thereby offsetting an increase in intersymbol interference associated therewith; and
- reducing a number of tones per symbol transformed from a time domain to a frequency domain responsive to a reduction in the sampling rate of the received communication channel in the reducing act.

Claim 9 (canceled)

Claim 10 (currently amended) A multi-tone X-DSL modem with a transmit path and a receive path both configured to couple to at least one subscriber line for modulation and demodulation of a communication channel in an X-DSL communication protocol, and the multi-tone modem comprising:

~~means for determining a highest useful frequency component in the received communication channel;~~

~~means for adjusting the sampling rate of the received communication channel to conform with the determination of the highest useful frequency component by the means for determining; and~~

- a time domain equalizer (TEQ) ~~having taps on~~ coupled to the receive path for time domain equalization of a received communication channel ~~of the modem to reduce intersymbol interference therein; and the TEQ configurable to adjust~~ as to at least one

of a number of time domain equalization taps ~~operating~~ on the receive path and delays between the taps ~~operating~~ on the receive path ~~responsive to the adjustment of the sampling rate by the means for adjusting~~;

- a discrete Fourier transform (DFT) component coupled to the receive path and configurable as to a number of tones per symbol of the received communication channel transformed from a time domain to a frequency domain; and
- at least one scaler coupled to the TEQ and the DFT component and the at least one scaler responsive to a determination that the received communication channel exhibits a cutoff frequency less a maximum frequency proscribed by the X-DSL communication protocol to reduce both a sampling rate of a received communication channel together with a number of tones per symbol transformed by the DFT component and to increase at least one of a number of time domain equalization taps on the receive path and delays between the taps on the receive path, thereby scaling the receive path to conform with a length of the at least one subscriber line.

Claims 11-13 (canceled)

Claim 14 (currently amended) ~~The A~~ modem of Claim 12, wherein the TEQ taps ~~further comprises~~ with a transmit and a receive path both configured to couple to at least one subscriber line and the modem comprising:

- a time domain equalizer (TEQ) having taps on the receive path of the modem to reduce intersymbol interference therein, and the TEQ configurable to vary at least one of a number of taps and delays between the taps operating on the receive path;
- a delay line accepting successive portions of a received communication channel;

- taps off of the successive portions of the delay line with each tap configured to scale each successive portion by an associated weighting coefficient to provide a corresponding scaled output;
- a summer coupled to the taps to sum the scaled outputs there from;
- a controller to varying at least one of: a length of the delay line, a number of the taps providing output to the summer and a number of successive portions of the received communication channel between taps;
- weighting modules each with an input coupled to a corresponding successive portion of the delay line and an output coupled to the summer, and each of the weighting modules configured to scale each corresponding successive portion by the associated weighting coefficient to provide the corresponding scaled output; and
- switches each associated with a corresponding weighting module to switchably control the coupling thereof between the delay line and the summer, and the switches operative to uncouple selected ones of the weighting modules to vary a number of the taps providing output to the summer.

Claims 15-20 (canceled)